N.
2-7-05

MWH

February 7, 2005

Kevin Adler, RPM
Mail Code SR-6J
U.S. Environmental Protection Agency
Region V
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Re: Results of the Soil Vapor Sampling at 1002 Reder Road, and
Recommendations for Additional Soil Vapor Sampling
American Chemical Service (ACS) National Priorities List (NPL) Site
Griffith, Indiana

Dear Kevin:

Several investigations in the upper aquifer have been conducted at the ACS Site near the intersection of Reder Road and Colfax Street. Through these investigations, MWH has identified an interval of residual hydrocarbons in a four-foot thick "smear zone" located about 20 feet below the ground surface. This smear zone was found to extend eastward from the ACS Site and under the property at the corner (1002 Reder Road). MWH is in the midst of an in-situ chemical oxidation (ISCO) program to reduce the hydrocarbon content in this smear zone.

At the request of the Agencies, MWH evaluated the potential that soil vapors near the house might contain volatile organic compounds (VOCs) that have migrated from the smear zone. Following the U.S. EPA's *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (Draft Guidance, November 2002), MWH determined that concentrations of VOCs, specifically benzene, in the soil and groundwater in the smear zone near the house were elevated enough to require collection of soil vapor samples based on that guidance document. Thus, with the approval of the Agencies, MWH conducted a soil vapor sampling event to determine if organic compounds were present in the shallow soil vapor near the house.

Soil Vapor Sampling Activities

On August 30, 2004, prior to the first full-scale ISCO application in the South Area, MWH collected four soil vapor samples in the vicinity of the house. Two boring locations were selected, one four feet west of the house (SP01) and the other 20 feet west of the house (SP02; Figure 1). Soil vapor samples were collected at two depth intervals in each boring: one at the approximate depth of the basement floor (between six and eight feet below ground surface [bgs]), and one a few feet above the water table (between 14 and 16 feet bgs).

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The soil vapor samples were collected using direct-push technology (DPT) sampling equipment. DPT probe rods were driven to the desired depth using hollow rods with an expendable stainless steel drive point. The drill rods were then withdrawn two feet, and Geoprobe™'s post-run tubing was inserted. The post-run tubing attaches to a fitting at the bottom of the DPT rods so that the tubing opening is sealed off from the annular space within the rods. Single-use, disposable tubing was used for each sample. A Gilian LFS-113 air sampling pump was used to purge the tubing of three tubing volumes. To collect the air sample, the tubing was attached to a six-liter Summa canister fitted with a flow controller calibrated to collect the sample in 30 minutes. All of the soil vapor samples took 35 to 45 minutes to fill the canister, confirming that a 'short-circuit' to the atmosphere did not occur during sample collection.

In addition to the four soil vapor samples, a duplicate sample was collected at location SP01 from the 14-16 foot interval, and an equipment blank (ambient air) sample (EB01) was collected at the ground surface. The soil vapor samples were sent to Air Toxics, Ltd. for laboratory analysis of VOCs via EPA Method TO-14A. The analytical results from these samples are shown in Table 1. The laboratory analytical report is provided in Attachment A.

Soil Vapor Sampling Results

Several VOCs were detected in each of the soil vapor samples (Table 1). The results were compared to the Target Concentrations provided in the EPA guidance document referenced above. These Target Concentrations were calculated by the EPA to correspond to the Target Indoor Air Concentrations using generic attenuation factors. The samples collected between six and eight feet bgs were compared to the Target Shallow Gas Concentrations, and the samples collected between 14-16 feet bgs were compared to the Target Deep Gas Concentrations. In the shallow gas samples, concentrations of benzene, ethylbenzene, methylene chloride, and tetrachloroethene (PCE) exceeded the Target Concentrations. In the deep samples, benzene, bromodichloromethane, PCE, and trichloroethene (TCE) exceeded the Target Concentrations.

Several of the detected VOCs were also detected at trace amounts in the equipment blank sample EB01. The detections in the equipment blank do not appear to be related to laboratory artifacts, as no compounds were detected in the laboratory blank sample (Appendix A). Instead, these detections may indicate that the compounds were present either in the ambient air or in the sampling equipment. Concentrations in the samples within five times the corresponding equipment blank concentrations were italicized in Table 1. None of the sample concentrations exceeding the Target Concentrations were within this five-times criteria.

While the sampling results show the presence of VOCs in all samples, the sample with the highest concentration of benzene was the shallow sample collected at location SP02, farthest from the house. The benzene concentrations in the deeper soil vapor samples (closer to the smear zone) were significantly lower. These results are more indicative that there is a source of benzene near the ground surface and near Colfax Avenue, than evidence that the smear zone is the source of soil vapors.

One potential shallow source for the benzene was identified during the initial work for the ISCO treatment program. While working in the area between Colfax Avenue and the house, the MWH geologist noted a natural gas odor. He contacted NIPSCO, the local gas company, who sent a representative to the site and it was discovered that the shutoff valve for the property was leaking. NIPSCO sent a crew to the site to repair the valve.

The shut-off valve was located about 30 inches below ground, at a location 13 feet from sample SP02 location (Figure 1). This is near the area that showed the higher benzene concentration. While natural gas is comprised of mostly methane, it is possible that it could contain some small amounts of benzene and these could have accumulated in the shallow soil.

Due to the elevated benzene concentration in the shallow soil near SP02, and the potential interference from the natural gas leak, the results of the initial soil vapor investigation are anomalous. However, according to the EPA guidance document the concentrations are elevated enough to warrant additional investigatory action. Therefore a second phase of soil vapor investigation is recommended.

Additional Soil Vapor Investigation Activities

Based on a meeting held between the U.S. EPA and MWH on November 15, 2004, the following scope of activities was determined:

Installation of a Soil Vapor Mitigation System. MWH has recommended to the owner of the property to have a soil vapor mitigation system installed at the house. This system is similar to a radon mitigation system, and will prevent potential intrusion of possible organic vapors into the house. The owner will coordinate the installation of the system directly with a licensed system contractor.

House Inspection and Indoor Air Sampling. MWH will conduct an inspection of the house that will focus on identifying and removing from the basement any potential chemicals (cleaners, glues, fuels, etc.) that could possibly interfere with indoor air samples. Once the mitigation system has operated for approximately six weeks MWH will collect an indoor air sample from the basement of the home. A second indoor air sample will be collected approximately three months later to confirm the initial results. An ambient air sample will be collected outside the house during each indoor air sampling event. The air samples will be collected in a Summa canister fitted with a 24-hour flow controller. The indoor air samples will be analyzed by Air Toxics, Ltd. for VOCs by TO-14 and methane by ASTM D-1946.

Additional Soil Vapor Sampling. MWH will collect additional soil vapor samples at five locations west of the house (Figure 1). Soil vapor samples will be collected from the same two depth intervals (6-8 and 14-16 feet bgs) at each location. One duplicate and one equipment blank sample will also be collected, for a total of 12 samples. The samples will be analyzed by Air Toxics, Ltd. for VOCs by TO-14 and methane by ASTM D-1946. The methane analyses will indicate if there is any residual natural gas in the soil from the leaky valve.

methane analyses will indicate if there is any residual natural gas in the soil from the leaky valve.

MWH will prepare a report summarizing the findings of the additional soil vapor sampling and indoor air sampling activities. If you have any questions or comments on this report or the proposed continuing evaluation, please do not hesitate to contact me.

Sincerely,

MWH Americas, Inc.

Peter J. Vagt, Ph.D. CPG
Vice President

Attachments:

Table 1 – Summary of Detected Volatile Organic Compounds in Soil Vapor Samples
Figure 1 – Proposed Additional Soil Vapor Sampling Locations
Appendix A – Air Toxics Laboratory Analytical Report

cc: P. Kasarabada, IDEM
L. Campbell, Black & Veatch
ACS Technical Committee

CAS/PJV/jmf
J:\209\0601 ACS\0122 General GW Remediation\Chemical Oxidation Full Scale 1\Soil Gas Sampling\Soil Vapor Report_EPA.doc

Tables

MWH

Table 1
Summary of Detected Volatile Organic Compounds in Soil Vapor Samples
American Chemical Service NPL Site, Griffith, Indiana

Sample Type	Blank	Shallow Soil Vapor			Deep Soil Vapor			
Sample ID	EB01	Target Shallow Gas Concentration (ppbv)*	SP01	SP02	Target Deep Gas Concentration (ppbv)*	SP01		SP02
Sample Depth (ft bgs)	0		6-8	6-8		14-16	DUP01	14-16
Distance from house	5 feet		4 feet	20 feet		4 feet		20 feet
1,1,1-trichloroethane	<0.88	4,000	<40	<340	40,000	2.0	1.3	<82
4-methyl-2-pentanone	<3.5	NA	<160	<1,400	NA	1.4 J	0.91 J	<330
Acetone	34	1,500	330	*140 J*	15,000	*7.3*	*5.4*	220 J
Benzene	1.8	0.98	450	7,000	9.8	*2.7*	*1.1*	49 J
Bromodichloromethane	<0.88	0.21	<40	<340	2.1	<0.82	<0.90	50 J
Carbon Disulfide	<3.5	2,200	<160	<1,400	22,000	0.74 J	<3.6	30 J
Chlorobenzene	<0.88	130	<40	<340	1,300	0.11 J	<0.90	<82
Chloroethane	<0.88	38,000	35 J	220 J	380,000	<0.82	<0.90	31 J
Chloromethane	0.81 J	12	<160	<1,400	120	<3.3	<3.6	<330
cis-1,2-dichloroethene	<0.88	88	<40	<340	880	1.5	0.44 J	<82
Ethylbenzene	4.0	5.1	25 J	120 J	51	*8.4*	*4.7*	*17 J*
m,p-xylene	20	16,000	120	310 J	160,000	*36*	*21*	*69 J*
2-butanone (MEK)	2.7 J	3,400	24 J	<1,400	34,000	*1.6 J*	*1.0 J*	<330
Methylene Chloride	0.25 J	15	32 J	350	150	*0.15 J*	<0.90	44 J
o-xylene	7.3	16,000	*29 J*	<340	160,000	*12*	*7.7*	*21 J*
Tetrachloroethene	0.21 J	1.2	38 J	<340	12	91	94	37 J
Toluene	13	1,100	*36 J*	*52 J*	11,000	*20*	*8.4*	*62 J*
Trichloroethene	<0.88	0.041	<40	<340	0.41	4.4	2.4	<82

Notes

Samples collected on August 30, 2004

All concentrations in parts per billion volume (ppbv)

* Corresponding to Target Indoor Air Concentration (Risk = 1x10-6; Table 2c of Draft Guidance).

J - indicates concentration is estimated (by laboratory)

MEK - methyl ethyl ketone

DUP01 - duplicate sample of SP01-14-16

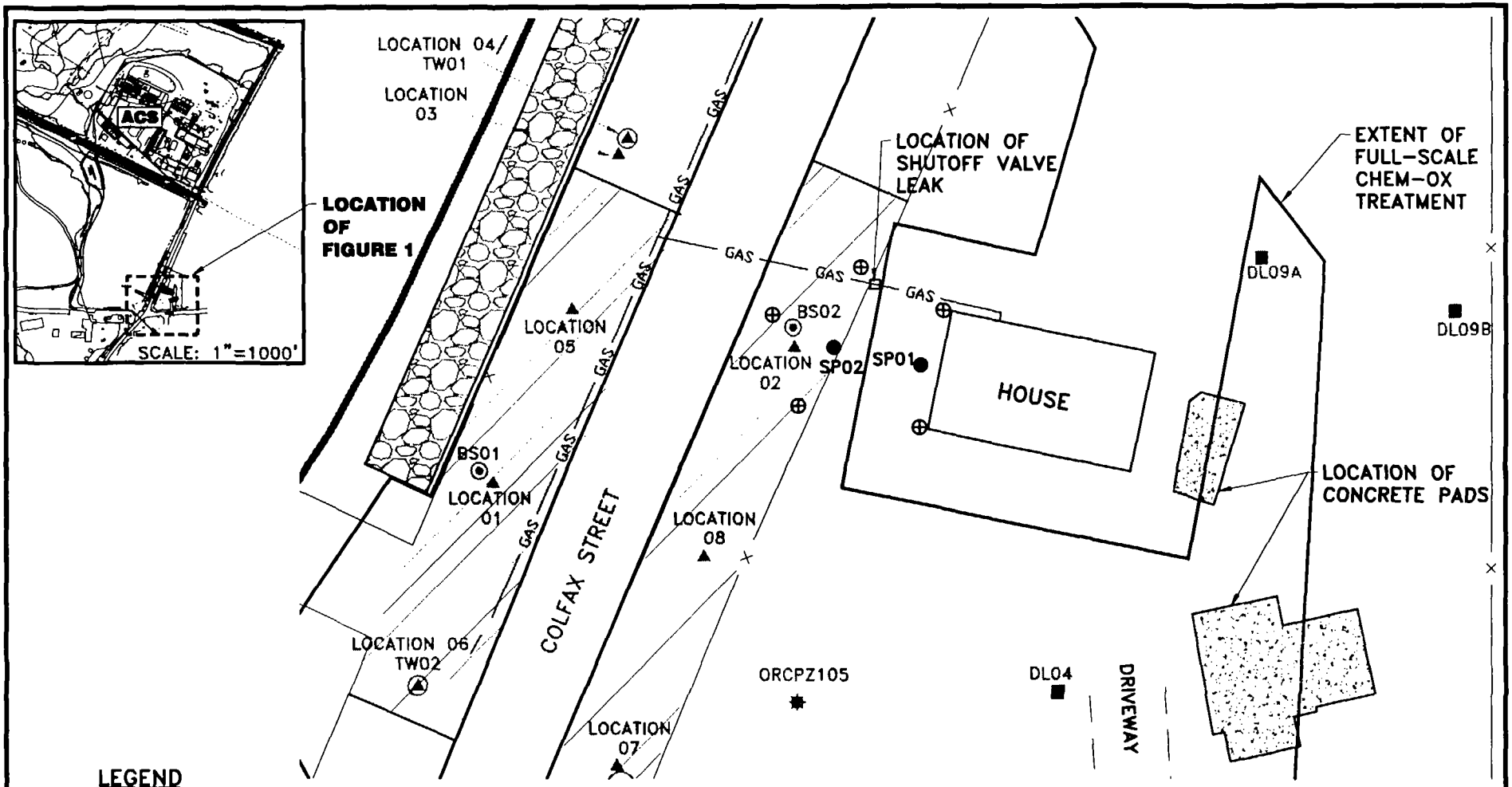
EB01 - Ambient air/equipment blank; sampled at surface.

Bold - indicates compound was detected above reporting limit

Italicized concentrations are within 5 times the corresponding concentration in EB01.

Boxed result indicates exceedance of Target Gas Concentration

Figures



LEGEND

- BARRIER WALL
- FENCE
- CHEM-OX APPLICATION AREA (TREATABILITY STUDY)
- RIP-RAP DRAINAGE CHANNEL
- ORCPZ105 — ORC PIEZOMETER LOCATION AND DESIGNATION
- TW01 — TEMPORARY WELL
- BS01 — BENCH-SCALE LABORATORY SAMPLE LOCATIONS
- LOCATION 01 — TREATABILITY STUDY SAMPLE LOCATIONS
- DL01 — DELINEATION SAMPLE LOCATIONS
- SP01 — SOIL VAPOR SAMPLE LOCATION (AUGUST 30, 2004)
- PROPOSED ADDITIONAL SOIL VAPOR SAMPLE LOCATION
- GAS — NATURAL GAS UTILITY (BURIED)

MWH

AMERICAN CHEMICAL SERVICE
NPL SITE
GRIFFITH, INDIANA

PROPOSED ADDITIONAL
SOIL VAPOR SAMPLING LOCATIONS

FIGURE 1

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Appendix A

APPENDIX A

AIR TOXICS LABORATORY ANALYTICAL REPORT

AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0408619

Work Order Summary

CLIENT:	Mr. Chris Daly MWH AMERICAS, INC. 175 West Jackson Blvd. Suite 1900 Chicago, IL 60604	**BILL TO:**	Mr. Lee Orosz Montgomery Watson Constructors 410 South Colfax Griffith, IN 46319
PHONE:	312-831-3415	**P.O. #**	
FAX:		**PROJECT #**	209601.012201 ACS
DATE RECEIVED:	08/31/2004	**CONTACT:**	DeDe Dodge
DATE COMPLETED:	09/14/2004		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.
01A	ACS-SG-SP0I-6-8'	Modified TO-14A	5.0 "Hg
02A	ACS-SG-SP0I-14-16'	Modified TO-14A	5.5 "Hg
03A	ACS-SG-DUP01	Modified TO-14A	7.5 "Hg
04A	ACS-SG-EB01	Modified TO-14A	7.0 "Hg
05A	ACS-SG-SP02-6-8'	Modified TO-14A	6.5 "Hg
06A	ACS-SG-SP02-14-16'	Modified TO-14A	5.5 "Hg
07A	Lab Blank	Modified TO-14A	NA
08A	CCV	Modified TO-14A	NA
09A	LCS	Modified TO-14A	NA
09AA	LCSD	Modified TO-14A	NA

CERTIFIED BY: Linda D. Frumarx DATE: 09/14/04

Laboratory Director

Certfication numbers: AR DEQ - 03-084-0, CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/04, Expiration date: 06/30/05
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-14A
Montgomery Watson Harza
Workorder# 0408619

Six 6 Liter Summa Canister samples were received on August 31, 2004. The laboratory performed analysis via modified EPA Method TO-14A using GC/MS in the full scan mode. The method involves concentrating up to 0.2 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis. See the data sheets for the reporting limits for each compound.

Method modifications taken to run these samples include:

Requirement	*TO-14A/TO-15*	*ATL Modifications*
Continuing Calibration criteria	</= 30% Difference	</= 30% Difference with two allowed out to </= 40% *Difference; flag and narrate outliers*
Initial Calibration criteria	RSD<30% (TO-14A)	RSD</=30%, two compounds allowed up to 40%.
Moisture control	Nafion Dryer (TO-14A)	Multisorbent trap
Blank acceptance criteria	<0.20 ppbv (TO-14A)	<Reporting Limit
Primary ions for Quantification	Freon 114: 85, Carbon Tetrachloride: 117, Trichloroethene: 130, Ethyl Benzene, m,p- and o-Xylene: 91, Vinyl Acetate: 43, 2-Butanone: 43, 4-Methyl-2-Pentanone: 43.	Freon 114: 135, Carbon Tetrachloride: 119, Trichloroethene: 95, Ethyl Benzene, m,p- and o-Xylene: 106, Vinyl Acetate: 86, 2-Butanone: 72, 4-Methyl-2-Pentanone: 58.
Dilutions for Initial Calibration	Dynamic dilutions or static using canisters	Syringe dilutions
BFB absolute abundance criteria	Within 10% of that from previous day. (TO-14A)	CCV internal standard area counts are compared to ICAL, corrective action for > 40% D.
Sample Load Volume	400 mL (TO-14A)	Varied to 200 mL
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request
Concentration of IS Spike.	10 ppbv (TO-15)	25 ppbv.
BFB Abundance	CLP Protocol (TO-15)	SW-846 Protocol
IS Recoveries.	Within 40% of mean over ICAL for blanks, and within 40% of daily CCV for samples. (TO-15)	Within 40% of CCV recoveries for blanks and samples.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified may be false positives.

Dilution was performed on samples ACS-SG-SP0I-6-8', ACS-SG-SP02-6-8' and ACS-SG-SP02-14-16' due to the presence of high level non-target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction no performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-SP01-6-8'

ID#: 0408619-01A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	i09100	Date of Collection: 8/30/04
Dil. Factor:	80.5	Date of Analysis: 9/10/04 12:29 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	40	Not Detected	100	Not Detected
Bromomethane	40	Not Detected	160	Not Detected
Chloroethane	40	35 J	110	93 J
1,1-Dichloroethene	40	Not Detected	160	Not Detected
Methylene Chloride	40	32 J	140	110 J
1,1-Dichloroethane	40	Not Detected	160	Not Detected
cis-1,2-Dichloroethene	40	Not Detected	160	Not Detected
Chloroform	40	Not Detected	200	Not Detected
1,1,1-Trichloroethane	40	Not Detected	220	Not Detected
Carbon Tetrachloride	40	Not Detected	260	Not Detected
Benzene	40	450	130	1500
1,2-Dichloroethane	40	Not Detected	160	Not Detected
Trichloroethene	40	Not Detected	220	Not Detected
1,2-Dichloropropane	40	Not Detected	190	Not Detected
cis-1,3-Dichloropropene	40	Not Detected	180	Not Detected
Toluene	40	36 J	150	140 J
trans-1,3-Dichloropropene	40	Not Detected	180	Not Detected
1,1,2-Trichloroethane	40	Not Detected	220	Not Detected
Tetrachloroethene	40	38 J	280	260 J
Chlorobenzene	40	Not Detected	190	Not Detected
Ethyl Benzene	40	25 J	180	110 J
m,p-Xylene	40	120	180	530
o-Xylene	40	29 J	180	130 J
Styrene	40	Not Detected	170	Not Detected
1,1,2,2-Tetrachloroethane	40	Not Detected	280	Not Detected
Bromodichloromethane	40	Not Detected	270	Not Detected
Dibromochloromethane	40	Not Detected	350	Not Detected
Chloromethane	160	Not Detected	340	Not Detected
Acetone	160	330	390	790
Carbon Disulfide	160	Not Detected	510	Not Detected
trans-1,2-Dichloroethene	160	Not Detected	650	Not Detected
2-Butanone (Methyl Ethyl Ketone)	160	24 J	480	74 J
4-Methyl-2-pentanone	160	Not Detected	670	Not Detected
2-Hexanone	160	Not Detected	670	Not Detected
Bromoform	160	Not Detected	1700	Not Detected

J = Estimated value.

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-SP01-6-8'

ID#: 0408619-01A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	i09100	Date of Collection:	8/30/04
Dil. Factor:	80	Date of Analysis:	9/10/04 12:29 PM

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	106	70-130

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-SP0I-14-16'

ID#: 0408619-02A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name: I091013 Date of Collection: 8/30/04 [illegible]

Dil. Factor: 1.64 Date of Analysis: 9/10/04 03:58 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.82	Not Detected	2.1	Not Detected
Bromomethane	0.82	Not Detected	3.2	Not Detected
Chloroethane	0.82	Not Detected	2.2	Not Detected
1,1-Dichloroethene	0.82	Not Detected	3.3	Not Detected
Methylene Chloride	0.82	0.15 J	2.9	0.55 J
1,1-Dichloroethane	0.82	Not Detected	3.4	Not Detected
cis-1,2-Dichloroethene	0.82	1.5	3.3	6.2
Chloroform	0.82	Not Detected	4.1	Not Detected
1,1,1-Trichloroethane	0.82	2.0	4.5	11
Carbon Tetrachloride	0.82	Not Detected	5.2	Not Detected
Benzene	0.82	2.7	2.7	8.7
1,2-Dichloroethane	0.82	Not Detected	3.4	Not Detected
Trichloroethene	0.82	4.4	4.5	24
1,2-Dichloropropane	0.82	Not Detected	3.8	Not Detected
cis-1,3-Dichloropropene	0.82	Not Detected	3.8	Not Detected
Toluene	0.82	20	3.1	76
trans-1,3-Dichloropropene	0.82	Not Detected	3.8	Not Detected
1,1,2-Trichloroethane	0.82	Not Detected	4.5	Not Detected
Tetrachloroethene	0.82	91	5.6	630
Chlorobenzene	0.82	0.11 J	3.8	0.50 J
Ethyl Benzene	0.82	8.4	3.6	37
m,p-Xylene	0.82	36	3.6	160
o-Xylene	0.82	12	3.6	55
Styrene	0.82	Not Detected	3.5	Not Detected
1,1,2,2-Tetrachloroethane	0.82	Not Detected	5.7	Not Detected
Bromodichloromethane	0.82	Not Detected	5.6	Not Detected
Dibromochloromethane	0.82	Not Detected	7.1	Not Detected
Chloromethane	3.3	Not Detected	6.9	Not Detected
Acetone	3.3	7.3	7.9	18
Carbon Disulfide	3.3	0.74 J	10	2.4 J
trans-1,2-Dichloroethene	3.3	Not Detected	13	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.3	1.6 J	9.8	4.8 J
4-Methyl-2-pentanone	3.3	1.4 J	14	6.0 J
2-Hexanone	3.3	Not Detected	14	Not Detected
Bromoform	3.3	Not Detected	34	Not Detected

J = Estimated value.

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-SP0I-14-16'

ID#: 0408619-02A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	091014	Date of Collection:	8/30/04
Dil. Factor:	1.6	Date of Analysis:	9/10/04 03:58 PM

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	98	70-130

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-DUP01

ID#: 0408619-03A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	090101	Date of Collection:	8/30/04
Dil. Factor:	1.79	Date of Analysis:	9/10/04 04:38 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.90	Not Detected	2.3	Not Detected
Bromomethane	0.90	Not Detected	3.5	Not Detected
Chloroethane	0.90	Not Detected	2.4	Not Detected
1,1-Dichloroethene	0.90	Not Detected	3.6	Not Detected
Methylene Chloride	0.90	Not Detected	3.2	Not Detected
1,1-Dichloroethane	0.90	Not Detected	3.7	Not Detected
cis-1,2-Dichloroethene	0.90	0.44 J	3.6	1.8 J
Chloroform	0.90	Not Detected	4.4	Not Detected
1,1,1-Trichloroethane	0.90	1.3	5.0	7.4
Carbon Tetrachloride	0.90	Not Detected	5.7	Not Detected
Benzene	0.90	1.1	2.9	3.5
1,2-Dichloroethane	0.90	Not Detected	3.7	Not Detected
Trichloroethene	0.90	2.4	4.9	13
1,2-Dichloropropane	0.90	Not Detected	4.2	Not Detected
cis-1,3-Dichloropropene	0.90	Not Detected	4.1	Not Detected
Toluene	0.90	8.4	3.4	32
trans-1,3-Dichloropropene	0.90	Not Detected	4.1	Not Detected
1,1,2-Trichloroethane	0.90	Not Detected	5.0	Not Detected
Tetrachloroethene	0.90	94	6.2	650
Chlorobenzene	0.90	Not Detected	4.2	Not Detected
Ethyl Benzene	0.90	4.7	3.9	21
m,p-Xylene	0.90	21	4.0	91
o-Xylene	0.90	7.7	4.0	34
Styrene	0.90	Not Detected	3.9	Not Detected
1,1,2,2-Tetrachloroethane	0.90	Not Detected	6.2	Not Detected
Bromodichloromethane	0.90	Not Detected	6.1	Not Detected
Dibromochloromethane	0.90	Not Detected	7.7	Not Detected
Chloromethane	3.6	Not Detected	7.5	Not Detected
Acetone	3.6	5.4	8.6	13
Carbon Disulfide	3.6	Not Detected	11	Not Detected
trans-1,2-Dichloroethene	3.6	Not Detected	14	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.6	1.0 J	11	3.0 J
4-Methyl-2-pentanone	3.6	0.91 J	15	3.8 J
2-Hexanone	3.6	Not Detected	15	Not Detected
Bromoform	3.6	Not Detected	38	Not Detected

J = Estimated value.

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-DUP01

ID#: 0408619-03A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	I091013	Date of Collection:	8/30/04
Dil. Factor:	1.70	Date of Analysis:	9/10/04 04:38 PM

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	99	70-130

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-EB01

ID#: 0408619-04A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	091004	Date of Collection:	8/30/04
Dil. Factor:	1.75	Date of Analysis:	9/10/04 05:44 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.88	Not Detected	2.3	Not Detected
Bromomethane	0.88	Not Detected	3.4	Not Detected
Chloroethane	0.88	Not Detected	2.3	Not Detected
1,1-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Methylene Chloride	0.88	0.25 J	3.1	0.90 J
1,1-Dichloroethane	0.88	Not Detected	3.6	Not Detected
cis-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Chloroform	0.88	Not Detected	4.3	Not Detected
1,1,1-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Carbon Tetrachloride	0.88	Not Detected	5.6	Not Detected
Benzene	0.88	1.8	2.8	5.7
1,2-Dichloroethane	0.88	Not Detected	3.6	Not Detected
Trichloroethene	0.88	Not Detected	4.8	Not Detected
1,2-Dichloropropane	0.88	Not Detected	4.1	Not Detected
cis-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
Toluene	0.88	13	3.4	51
trans-1,3-Dichloropropene	0.88	Not Detected	4.0	Not Detected
1,1,2-Trichloroethane	0.88	Not Detected	4.8	Not Detected
Tetrachloroethene	0.88	0.21 J	6.0	1.5 J
Chlorobenzene	0.88	Not Detected	4.1	Not Detected
Ethyl Benzene	0.88	4.0	3.9	18
m,p-Xylene	0.88	20	3.9	87
o-Xylene	0.88	7.3	3.9	32
Styrene	0.88	Not Detected	3.8	Not Detected
1,1,2,2-Tetrachloroethane	0.88	Not Detected	6.1	Not Detected
Bromodichloromethane	0.88	Not Detected	6.0	Not Detected
Dibromochloromethane	0.88	Not Detected	7.6	Not Detected
Chloromethane	3.5	0.81 J	7.3	1.7 J
Acetone	3.5	34	8.4	81
Carbon Disulfide	3.5	Not Detected	11	Not Detected
trans-1,2-Dichloroethene	3.5	Not Detected	14	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.5	2.7 J	10	8.2 J
4-Methyl-2-pentanone	3.5	Not Detected	14	Not Detected
2-Hexanone	3.5	Not Detected	14	Not Detected
Bromoform	3.5	Not Detected	37	Not Detected

J = Estimated value.

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-EB01

ID#: 0408619-04A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	109101	Date of Collection:	8/30/0
Dil. Factor:	1.75	Date of Analysis:	9/10/04 05:44 PM

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	100	70-130

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-SP02-6-8'

ID#: 0408619-05A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	I0910_5	Date of Collection: 8/30/04
Dil. Factor:	68.1	Date of Analysis: 9/10/04 06:24 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	340	Not Detected	890	Not Detected
Bromomethane	340	Not Detected	1300	Not Detected
Chloroethane	340	220 J	920	590 J
1,1-Dichloroethene	340	Not Detected	1400	Not Detected
Methylene Chloride	340	350	1200	1200
1,1-Dichloroethane	340	Not Detected	1400	Not Detected
cis-1,2-Dichloroethene	340	Not Detected	1400	Not Detected
Chloroform	340	Not Detected	1700	Not Detected
1,1,1-Trichloroethane	340	Not Detected	1900	Not Detected
Carbon Tetrachloride	340	Not Detected	2200	Not Detected
Benzene	340	7000	1100	23000
1,2-Dichloroethane	340	Not Detected	1400	Not Detected
Trichloroethene	340	Not Detected	1900	Not Detected
1,2-Dichloropropane	340	Not Detected	1600	Not Detected
cis-1,3-Dichloropropene	340	Not Detected	1600	Not Detected
Toluene	340	52 J	1300	200 J
trans-1,3-Dichloropropene	340	Not Detected	1600	Not Detected
1,1,2-Trichloroethane	340	Not Detected	1900	Not Detected
Tetrachloroethene	340	Not Detected	2400	Not Detected
Chlorobenzene	340	Not Detected	1600	Not Detected
Ethyl Benzene	340	120 J	1500	520 J
m,p-Xylene	340	310 J	1500	1400 J
o-Xylene	340	Not Detected	1500	Not Detected
Styrene	340	Not Detected	1500	Not Detected
1,1,2,2-Tetrachloroethane	340	Not Detected	2400	Not Detected
Bromodichloromethane	340	Not Detected	2300	Not Detected
Dibromochloromethane	340	Not Detected	3000	Not Detected
Chloromethane	1400	Not Detected	2900	Not Detected
Acetone	1400	140 J	3300	340 J
Carbon Disulfide	1400	Not Detected	4300	Not Detected
trans-1,2-Dichloroethene	1400	Not Detected	5500	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1400	Not Detected	4100	Not Detected
4-Methyl-2-pentanone	1400	Not Detected	5700	Not Detected
2-Hexanone	1400	Not Detected	5700	Not Detected
Bromoform	1400	Not Detected	14000	Not Detected

J = Estimated value.

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-SP02-6-8'

ID#: 0408619-05A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	I091015	Date of Collection:	8/30/0
Dil. Factor:	60	Date of Analysis:	9/10/04 06:24 P

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	103	70-130

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-SP02-14-16'

ID#: 0408619-06A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	091004	Date of Collection: 8/30/04
Dil. Factor:	16	Date of Analysis: 9/10/04 07:57 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	82	Not Detected	210	Not Detected
Bromomethane	82	Not Detected	320	Not Detected
Chloroethane	82	31 J	220	82 J
1,1-Dichloroethene	82	Not Detected	330	Not Detected
Methylene Chloride	82	44 J	290	160 J
1,1-Dichloroethane	82	Not Detected	340	Not Detected
cis-1,2-Dichloroethene	82	Not Detected	330	Not Detected
Chloroform	82	Not Detected	410	Not Detected
1,1,1-Trichloroethane	82	Not Detected	450	Not Detected
Carbon Tetrachloride	82	Not Detected	520	Not Detected
Benzene	82	49 J	270	160 J
1,2-Dichloroethane	82	Not Detected	340	Not Detected
Trichloroethene	82	Not Detected	450	Not Detected
1,2-Dichloropropane	82	Not Detected	380	Not Detected
cis-1,3-Dichloropropene	82	Not Detected	380	Not Detected
Toluene	82	62 J	310	240 J
trans-1,3-Dichloropropene	82	Not Detected	380	Not Detected
1,1,2-Trichloroethane	82	Not Detected	450	Not Detected
Tetrachloroethene	82	37 J	560	260 J
Chlorobenzene	82	Not Detected	380	Not Detected
Ethyl Benzene	82	17 J	360	76 J
m,p-Xylene	82	69 J	360	310 J
o-Xylene	82	21 J	360	94 J
Styrene	82	Not Detected	350	Not Detected
1,1,2,2-Tetrachloroethane	82	Not Detected	570	Not Detected
Bromodichloromethane	82	50 J	560	340 J
Dibromochloromethane	82	Not Detected	710	Not Detected
Chloromethane	330	Not Detected	690	Not Detected
Acetone	330	220 J	790	530 J
Carbon Disulfide	330	30 J	1000	94 J
trans-1,2-Dichloroethene	330	Not Detected	1300	Not Detected
2-Butanone (Methyl Ethyl Ketone)	330	Not Detected	980	Not Detected
4-Methyl-2-pentanone	330	Not Detected	1400	Not Detected
2-Hexanone	330	Not Detected	1400	Not Detected
Bromoform	330	Not Detected	3400	Not Detected

J = Estimated value.

Container Type: 6 Liter Summa Canister

AIR TOXICS LTD.

SAMPLE NAME: ACS-SG-SP02-14-16'

ID#: 0408619-06A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	i0910	Date of Collection:	8/30/0
Dil. Factor:	1.64	Date of Analysis:	9/10/04 07:57 PM

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	103	70-130

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 0408619-07A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	I091006a	Date of Collection:	N/A
Dil. Factor:	1.00	Date of Analysis:	9/10/04 11:41 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Bromomethane	0.50	Not Detected	2.0	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Methylene Chloride	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Chloroform	0.50	Not Detected	2.5	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.8	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.2	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.8	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.2	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.5	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
Dibromochloromethane	0.50	Not Detected	4.3	Not Detected
Chloromethane	2.0	Not Detected	4.2	Not Detected
Acetone	2.0	Not Detected	4.8	Not Detected
Carbon Disulfide	2.0	Not Detected	6.3	Not Detected
trans-1,2-Dichloroethene	2.0	Not Detected	8.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	6.0	Not Detected
4-Methyl-2-pentanone	2.0	Not Detected	8.3	Not Detected
2-Hexanone	2.0	Not Detected	8.3	Not Detected
Bromoform	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 0408619-07A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	i091006	Date of Collection:	
Dil. Factor:	1.08	Date of Analysis:	9/10/04 11:01 AM

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	96	70-130

AIR TOXICS LTD.

SAMPLE NAME: CCV

ID#: 0408619-08A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	I091002	Date of Collection:	
Dil. Factor:	1.00	Date of Analysis:	9/10/04 08:38 AM

Compound	%Recovery
Vinyl Chloride	120
Bromomethane	108
Chloroethane	107
1,1-Dichloroethene	103
Methylene Chloride	80
1,1-Dichloroethane	103
cis-1,2-Dichloroethene	97
Chloroform	107
1,1,1-Trichloroethane	103
Carbon Tetrachloride	105
Benzene	106
1,2-Dichloroethane	106
Trichloroethene	105
1,2-Dichloropropane	106
cis-1,3-Dichloropropene	107
Toluene	103
trans-1,3-Dichloropropene	106
1,1,2-Trichloroethane	106
Tetrachloroethene	112
Chlorobenzene	104
Ethyl Benzene	107
m,p-Xylene	114
o-Xylene	106
Styrene	114
1,1,2,2-Tetrachloroethane	103
Bromodichloromethane	107
Dibromochloromethane	117
Chloromethane	108
Acetone	96
Carbon Disulfide	99
trans-1,2-Dichloroethene	98
2-Butanone (Methyl Ethyl Ketone)	106
4-Methyl-2-pentanone	114
2-Hexanone	115
Bromoform	118

Container Type: NA - Not Applicable

AIR TOXICS LTD.

SAMPLE NAME: CCV

ID#: 0408619-08A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	I091002	Date of Collection:	
Dil. Factor:	1.0	Date of Analysis:	9/10/04 08:38 AM

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	98	70-130

AIR TOXICS LTD.

SAMPLE NAME: LCS

ID#: 0408619-09A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name: i091003S	Date of Collection: NA
Dil. Factor: 1.00	Date of Analysis: 9/10/04 09:18 AM

Compound	%Recovery
Vinyl Chloride	105
Bromomethane	107
Chloroethane	115
1,1-Dichloroethene	99
Methylene Chloride	70
1,1-Dichloroethane	102
cis-1,2-Dichloroethene	97
Chloroform	107
1,1,1-Trichloroethane	105
Carbon Tetrachloride	108
Benzene	111
1,2-Dichloroethane	110
Trichloroethene	110
1,2-Dichloropropane	119
cis-1,3-Dichloropropene	106
Toluene	107
trans-1,3-Dichloropropene	104
1,1,2-Trichloroethane	106
Tetrachloroethene	111
Chlorobenzene	103
Ethyl Benzene	105
m,p-Xylene	116
o-Xylene	102
Styrene	113
1,1,2,2-Tetrachloroethane	104
Bromodichloromethane	111
Dibromochloromethane	115
Chloromethane	101
Acetone	96
Carbon Disulfide	100
trans-1,2-Dichloroethene	100
2-Butanone (Methyl Ethyl Ketone)	127
4-Methyl-2-pentanone	120
2-Hexanone	121
Bromoform	119

Container Type: NA - Not Applicable

AIR TOXICS LTD.

SAMPLE NAME: LCS

ID#: 0408619-09A

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	090100-1	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis:	9/10/04 09:18 A

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	101	70-130

AIR TOXICS LTD.

SAMPLE NAME: LCSD

ID#: 0408619-09AA

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	091004	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis:	9/10/04 09:58 AM

Compound	%Recovery
Vinyl Chloride	101
Bromomethane	105
Chloroethane	114
1,1-Dichloroethene	99
Methylene Chloride	71
1,1-Dichloroethane	104
cis-1,2-Dichloroethene	98
Chloroform	108
1,1,1-Trichloroethane	105
Carbon Tetrachloride	107
Benzene	111
1,2-Dichloroethane	110
Trichloroethene	108
1,2-Dichloropropane	117
cis-1,3-Dichloropropene	105
Toluene	107
trans-1,3-Dichloropropene	105
1,1,2-Trichloroethane	108
Tetrachloroethene	114
Chlorobenzene	104
Ethyl Benzene	106
m,p-Xylene	115
o-Xylene	102
Styrene	113
1,1,2,2-Tetrachloroethane	104
Bromodichloromethane	110
Dibromochloromethane	117
Chloromethane	99
Acetone	97
Carbon Disulfide	101
trans-1,2-Dichloroethene	100
2-Butanone (Methyl Ethyl Ketone)	128
4-Methyl-2-pentanone	120
2-Hexanone	124
Bromoform	120

Container Type: NA - Not Applicable

AIR TOXICS LTD.

SAMPLE NAME: LCSD

ID#: 0408619-09AA

MODIFIED EPA METHOD TO-14A GC/MS FULL SCAN

File Name:	i091004	Date of Collection: N/A	
Dil. Factor:	1.00	Date of Analysis:	9/10/04 09:58 AM

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	102	70-130

@ AIR TOXICS LTD.
AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

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CHAIN-OF-CUSTODY RECORD

Contact Person: CHAD SMITH
Company: MWH
Email:
Address: 175 W JACKSON City: CHICAGO State: IL Zip: 60604
Phone: 312.831.3090 Fax: 312.831.3021
Collected by: (Signature) Samuel Powers

Project Info:
P.O. #:
Project #: Z09601.0122.01
Project Name: ACS

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by: CE
Date: 9/3/04
Pressurization Gas: (N2) He

Lab I.D.	Field Sample I.D. (Location)	Date	Time	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psig)
01A	ACS-SC-SP01-6-8'	8/30/04	1232	VOCs (TO-14)	>-30	-4	5.0"Hg	5psi
02A	ACS-SC-SP01-14-16'	8/30/04	1348		>-30	-5	5.5"Hg	
03A	ACS-SG-DUP01	8/30/04	1422		>-30	-5	7.5"Hg	
04A	ACS-SC-EB01	8/30/04	1408		>-30	-4	7.0"Hg	
05A	ACS-SC-SP02-6-8'	8/30/04	1528		>-30	-5	6.5"Hg	
06A	ACS-SC-SP02-14-16'	8/30/04	1610		>-30	-5	5.5"Hg	

Relinquished by: (signature) Samuel Powers Date/Time 8/30/04 1800
Received by: (signature) Samuel Thomas ATL Date/Time 8/31/04 940
Notes:

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Lab Use Only

Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
FedEx	7941763297 0215	—	Good	Yes No None	0408619

Form 1236 rev. 10